UK Microbial Forensic Consortium (UKMFC)

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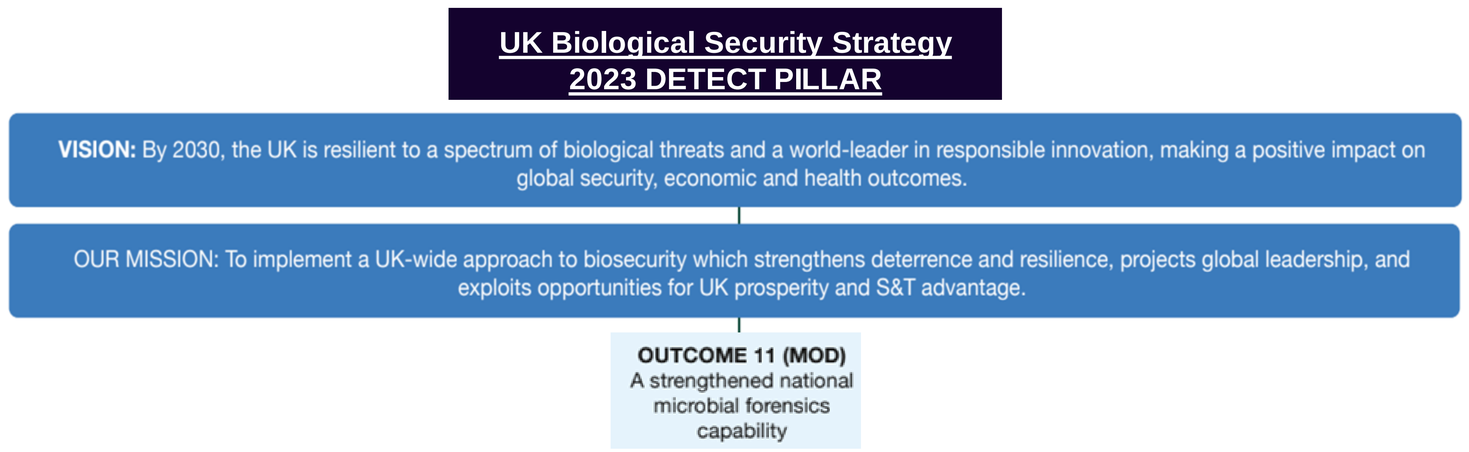
The UK Microbial Forensics Consortium (UKMFC) project

The UKMFC project forms part of the 2023 UK Biological Security Strategy (BSS). The project aims to strengthen microbial forensics as a national capability with a central theme of determining (as far as possible) whether a given organism has arisen naturally or a consequence of a nefarious release. A stocktake of UK laboratories identified genomics and bioinformatics as an area of strength and therefore has formed the initial focus for improving the microbial forensic capability of the UK.

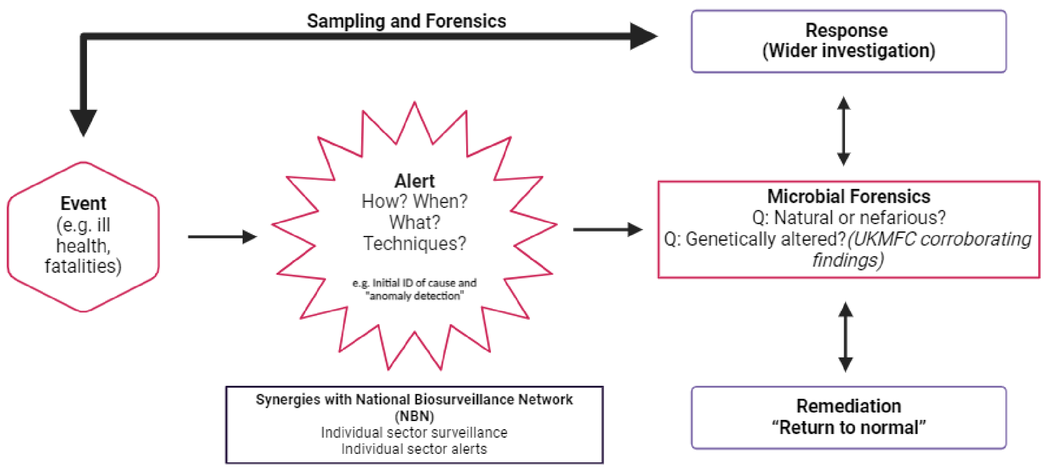


What is Microbial Forensics?

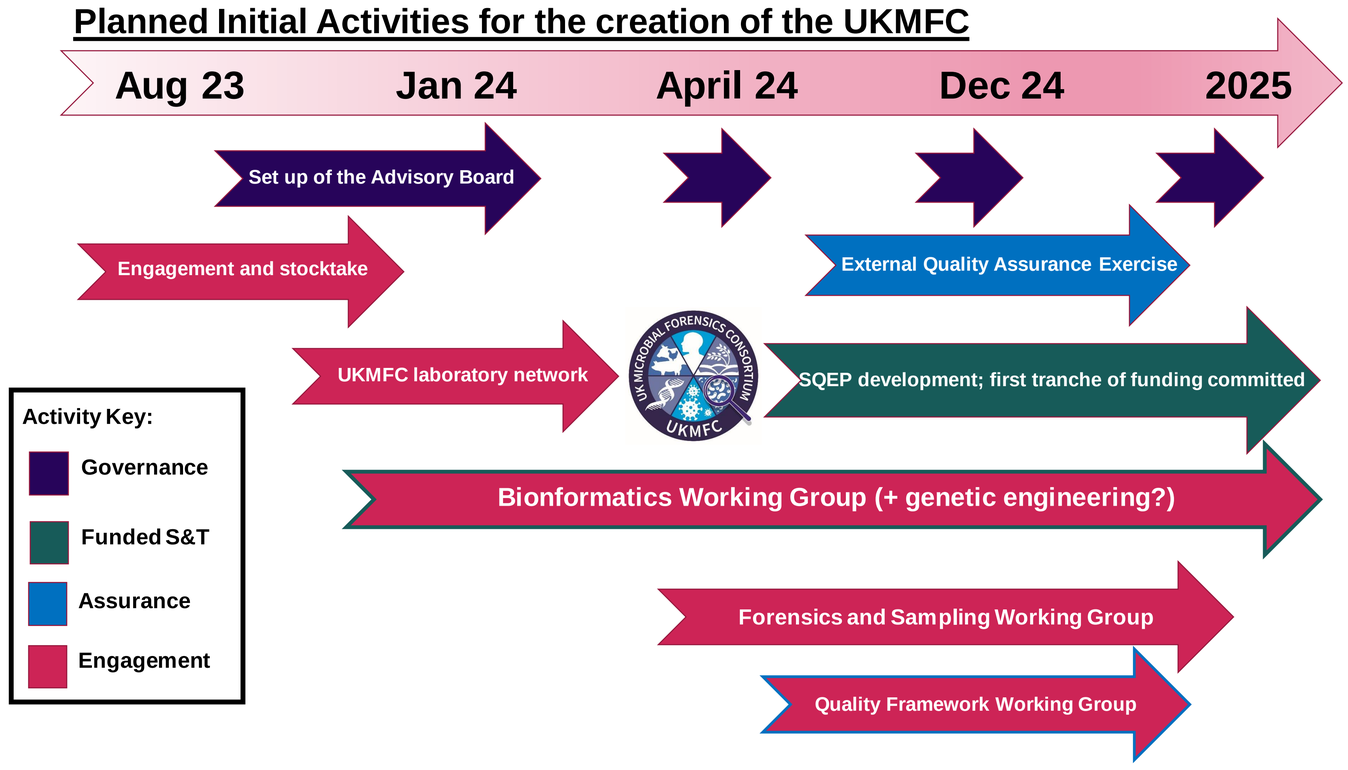
Microbial Forensics; aims to identify whether a biological agent is **natural** or **nefarious** in origin. Investigations to include whether:

- A natural outbreak versus accidental release
- An Emerging pathogen or engineered organism (e.g. SynBio)?

- ***Microbial*** = intentionally broad term to capture all biological hazards
  - Bacteria, virus, fungi, toxin, parasites, possibly even insects
- ***Forensics*** = provide more information than simple identification of the biological hazard. To include:
  - Origin or provenance, evidence of laboratory growth or genetic engineering, anti-microbial resistance



Planned Initial Activities for the creation of the UKMFC



Across all sectors (e.g. clinical, agricultural, food) UKMFC is cross-cutting in its objectives:

- Continue to develop **microbial forensic analysis capability** against a spectrum of threats, especially in the new era of **synthetic biology**.
- Be able to **attribute the misuse of biological hazards** and thereby act as a deterrent to hostile use.
- Collaborate widely with government laboratories, academia, industry, and our international allies and partners
- Develop **specialist microbial forensic skills** and capacity **across the four nations of the UK** to strengthen resilience and ensure capabilities are fit for the future.

Bioinformatics Working Group:

A stocktake of the Biosurveillance activities been undertaken within the UK highlighted sequencing and bioinformatics as a common area across sectors. The UKMFC bioinformatics working group (BWG) has been set up to develop a suite of tools that support front line surveillance laboratories. The BWG aims to leverage world class cross-governmental expertise in bioinformatics and genomics to overcome the key challenges for UK Biosecurity.

Examples of S&T Challenges:

- Engineered organisms with minimal 'scars' in a genome (i.e. small number of nucleotides)
- Organisms with significant alterations to their genomes (i.e. insertion/deletion of whole genes or pathways).
- Synthetic organisms (i.e. with little or no resemblance to natural organisms).

Critical Performance Factors for the UKMFC bioinformatics tools:

- Must be accessible and usable by front line surveillance laboratories (i.e. a low barrier of entry both to IT infrastructure and low burden on computational expertise).
- Should augment and not replace existing analytical tools and support to Subject Matter Experts (SMEs) in each sector; enabling an initial assessment of whether an outbreak is natural or nefarious in origin to be made

Analytical techniques used for an initial ID?